DOE/PC/92120--T10

Quarterly Report
Final

ADVANCED COAL LIQUEFACTION

To

PITTSBURGH ENERGY TECHNOLOGY CENTER

April 1, 1995
to
June 30, 1995

DE-AC22-93PC92120

Media and Process Technology Inc.
1155 William Pitt Way
Pittsburgh, PA 15238

RECEIVED
USDOE/PETC
95 SEP -5 PM 1:46
ACQUISITION & ASSISTANCE DIV.

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Several permeation run was conducted in this quarter to prove the functionality of the experimental system. Compound #9 in tetralin was decomposed to bibenzyl and methyl bibenzyl at 400°C and 200 psi. Since no carbon catalyst was used, the reaction was resulted from the surface of the ceramic membrane coated with carbon. Major reaction products were identified from the chromatogram. Although the permeate composition analysis fails to close the material balance, the experimental runs demonstrated the viability of the experimental system and technical concept. In the next quarter, we will continue the similar test to reach a satisfactory material balance.

Discussion

1. Characterization of Ceramic Membrane

A 10" Si-CVD modified ceramic membrane was used for this quarter of study. This membrane was characterized with helium and nitrogen at room temperature and 600°C as shown in Table 1. Based upon this characterization data, we believe that the pore size of this membrane is around 10Å. It could perform some limited separation of compound #9 from tetralin according to our previous separation experience using other membranes. This membrane was coated with carbon before the filtration study to minimize the possible fouling potential of the porous structure of the membrane. The gas permeation flux measured before and after carbon coating (shown in Table 1) indicates that pore size distribution was not altered noticeably through carbon coating.

2. Permeation of Compound #9/Tetralin

The above membrane (Si519) was used to perform the liquid filtration at 400°C with 200 psi of pressure drop. The feed contains 0.38wt% of compound #9 (at retention time of 18.9) in tetralin. In addition, it contains a significant amount of an unknown compound (at retention time of 16), and other impurities came with tetralin. The compound #9 in this feed was consumed as a result of the loss through permeation primarily. Since no other significant compounds were present in the feed at the end of the run (Figure A-15), it is believed that the decomposition of the compound #9 at the surface of the membrane is insignificant. Also, the unknown compound behaves similarly to compound #9, which could interfere the material balance calculation.

Figure 1 and Table 2 both summarize the concentration change throughout the permeation study which lasted 9 hours. Compound #9 was reduced from 0.38 to 0.33 wt%. Initially compound #9 was collected along with its degradation products. However, after hour 3, no compound #9 was found in the permeate. Instead, bibenzyl was found throughout the entire permeation run with the concentration in the neighborhood of 0.05wt%. 0.2-0.3wt% methyl bibenzyl concentration was found.

The permeation rate appeared constant throughout the entire run as shown in Figure 2. This constant flux was not observed in the past and could be possibly attributed to the larger pore size of the membrane. At the end of the run, black

precipitate like carbon powder was collected in the permeate line. This indicates that some of the reactions may not be accounted for by the material increase and decrease shown in the chromatogram. Also, the combined concentration of bibenzyl and methyl bibenzyl appeared higher than that of compound #9. Evidently, the unknown peak was involved in the reaction process. Therefore, no material balance check was attempted. Additional study will be performed in the next quarter to determine the source of carbon and its impact on the material balance calculation. The unknown compound and its effect on the overall material balance will also be evaluated.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Table 1. Characterization of Si-modified Membrane Si-519

	<u>Temp. (°C)</u>	<u>Gas Component</u>	<u>Permeance (m³/m²/hr/bar)</u>
1. Si-519 as received	20	N ₂	0.550
	20	He	1.3937
	499	N ₂	0.6314
	500	He	4.037
2. Si-519 with carbon coating	504	N ₂	0.6434
	504	He	4.145
	25	N ₂	0.7568
	25	He	1.9914

Table 2. Permeation of Compound #9 in Tetralin through Si519 (7/20/95) at 400°C and 200 psi

<u>Time (Hour)</u>	<u>Feed (Compound #9)</u>	<u>Permeate (Compound #9)</u>	<u>Permeate (Bibenzyl)</u>	<u>Permeate(Methyl Bibenzyl)</u>
0	0.38	0.00	0.00	0.00
1	0.37	0.07	0.10	0.31
2	0.34	0.06	0.08	0.33
3		0.01	0.07	0.29
4		0.00	0.06	0.25
5		0.00	0.06	0.24
6	0.34	0.00	0.05	0.24
7		0.00	0.05	0.22
8	0.35	0.00	0.05	0.20
9	0.33	0.00	0.05	0.19

Note: All concentrations in wt%

Figure 1. Permeation of Compound #9 in Tetralin through Si519 (7/20/95)

Figure 2. Permeation of Compound #9 in Tetralin Through Si529 (7/20/95)

Appendix

Figure A-1. Feed Before the Permeation Study

Figure A-2. Feed Corresponding to Hour 1 of Permeation Study

Figure A-3. Feed Corresponding to Hour 2 of Permeation Study

Figure A-4. Permeate Collected at Hour 1

Figure A-5. Permeate Collected at Hour 2

Figure A-6. Permeate Collected at Hour 3

Figure A-7. Permeate Collected at Hour 4

Figure A-8. Permeate Collected at Hour 5

Figure A-9. Feed Corresponding to Hour 6 of Permeation Study

Figure A-10. Permeate Collected at Hour 6

Figure A-11. Permeate Collected at Hour 7

Figure A-12. Feed Corresponding to Hour 8

Figure A-13. Permeate Collected at Hour 8

Figure A-14. Feed Corresponding to Hour 9

Figure A-15. Permeate Collected at Hour 9

Figure A-16. Feed Corresponding to the End of the Permeation Study

Initial feed 1.0

1: Sig. 2 of DATA:BIBENZ.D

Figure A-1. Feed Before the Permeation Study

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.89 cm/min

*** External Standard ***

Operator:

20 Jul 95 9:29 am

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Type	Time	Signal Description	Compound Name	Area	Amount
1	1	-----		GC Signal 2	BIBENZYL	*** Not Found ***	
2	1VV		19.870	GC Signal 2	COMP#9	94215	0.38225 WT%

----- VV 19.271 GC Signal 2 Uncalibrated 4593.81 4593.8 WT%

Sample peak #1 not found at retention time 11.840 +/- 0.050 min.

*** Not all calibrated peaks found ***

7-20 feed (1)

1: Sig. 2 of DATA:BIBENZ.D

Figure A-2. Feed Corresponding to Hour 1 of Permeation Study

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.89 cm/min

*** External Standard ***

Operator:

20 Jul 95 10:11 am

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	1	-----	GC Signal 2	BIBENZYL	*** Not Found ***	
2	1VV	18.866	GC Signal 2	COMP#9	91167	0.36701 WT%

----- VV 11.693 GC Signal 2 Uncalibrated 2574.30 2574.3 WT%

Sample peak #1 not found at retention time 11.840 +/- 0.050 min.

*** Not all calibrated peaks found ***

Feed (2)
7-20-95

1: Sig. 2 of DATA:8IBENZ.D

End of plot. Time = 0.00 to 22.51 minutes

Chart speed = 0.88 cm/min

Figure A-3. Feed Corresponding to Hour 2 of Permeation Study

*** External Standard ***

Operator:

20 Jul 95 12:34 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	1	-----	GC Signal 2	BIBENZYL	*** Not Found ***	
2	UVV	18.864	GC Signal 2	COMP#9	86141	0.34188 WT%

----- UVV 11.689 GC Signal 2 Uncalibrated 2516.87 2516.9 WT%

Sample peak #1 not found at retention time 11.840 +/- 0.050 min.

*** Not all calibrated peaks found ***

① PERM 1
7-20-95

1: Sig. 2 of DATA:BIBENZ.D

Figure A-4. Permeate Collected at Hour 1

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.89 cm/min

*** External Standard ***

Operator:

20 Jul 95 1:04 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	UV	11.816	GC Signal 2	BIBENZYL	44703	0.082824 WT%
2	UV	18.838	GC Signal 2	COMP#9	18017	0.058986 WT%
-----	UV	12.504	GC Signal 2	Uncalibrated	175416	175416 WT%

② Perm Flux
7-20-95

1: Sig. 2 of DATA:8IBENZ.D

Figure A-5. Permeate Collected at Hour 2

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.89 cm/min

*** External Standard ***

Operator:
Method File Name : WBSIBENZ.M
Sample Info :
Misc Info:

20 Jul 95 11:13 am

Integration File Name : DATA:BIBENZ.I
consisting of channels : 1. GC Signal 2 of BIBENZ.O
Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	UV	11.816	GC Signal 2	BIBENZYL	52338	0.096970 WT%
2	UV	18.840	GC Signal 2	COMP#9	20807	0.067465 WT%
-----	UV	12.503	GC Signal 2	Uncalibrated	166411	166411 WT%

③ Perm Flux
7-20-95

1: Sig. 2 of DATA:BIBENZ.D

Figure A-6. Permeate Collected at Hour 3

End of plot. Time = 0.00 to 22.51 minutes

Chart speed = 0.88 cm/min

*** External Standard ***

Operator:

20 Jul 95 1:37 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	1VV	11.815	GC Signal 2	BIBENZYL	38530	0.071386 WT%
2	1VV	18.834	GC Signal 2	COMP#9	3497.64	0.011451 WT%
-----	VV	12.500	GC Signal 2	Uncalibrated	154056	154056 WT%

④ Perm 1
7-20-95

1: Sig. 2 of DATA:BIBENZ.D

Figure A-7. Permeate Collected at Hour 4

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.89 cm/min

*** External Standard ***

Operator: 20 Jul 95 2:12 pm
 Method File Name : WBBIBENZ.M
 Sample Info :
 Misc Info:
 Integration File Name : DATA:BIBENZ.I
 consisting of channels : 1. GC Signal 2 of BIBENZ.D
 Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am
 Reference Peak Window: 5.00 Absolute Minutes
 Non-Reference Peak Window: 0.10 Absolute Minutes
 Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	UV	11.811	GC Signal 2	BIBENZYL	33250	0.061604 WT%
2	1	-----	GC Signal 2	COMP#9	***	Not Found ***

----- UV 12.496 GC Signal 2 Uncalibrated 134265 134265 WT%
 Sample peak #2 not found at retention time 18.869 +/- 0.050 min.
 *** Not all calibrated peaks found ***

1: Sig. 2 of DATA:BIBENZ.D

⑤ Perm Flux
7-20

Figure A-8. Permeate Collected at Hour 5

End of plot. Time = 0.00 to 22.51 minutes

Chart speed = 0.88 cm/min

*** External Standard ***

Operator:

20 Jul 95 3:04 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	UV	11.811	GC Signal 2	BIBENZYL	31291	0.057976 WT%
2	1	-----	GC Signal 2	COMP#9	*** Not Found ***	
-----	UV	12.305	GC Signal 2	Uncalibrated	2837.81	2837.8 WT%
-----	UV	12.496	GC Signal 2	Uncalibrated	130981	130981 WT%

Sample peak #2 not found at retention time 18.869 +/- 0.050 min.

*** Not all calibrated peaks found ***

1: Sig. 2 of DATA:BIBENZ.D

Figure A-9. Feed Corresponding to Hour 6 of Permeation Study

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.99 cm/min

*** External Standard ***

Operator:

21 Jul 95 11:06 am

Method File Name : W8BIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	1	-----	GC Signal 2	BIBENZYL		*** Not Found ***
2	1VV	18.888	GC Signal 2	COMP#9	90076	0.36155 WT%

----- VV 19.724 GC Signal 2 Uncalibrated 2722.07 2722.1 WT%

Sample peak #1 not found at retention time 11.840 +/- 0.050 min.

*** Not all calibrated peaks found ***

Perm 7-20-95

1: Sig. 2 of DATA:8IBENZ.D

Figure A-10. Permeate Collected at Hour 6

End of plot. Time = 0.00 to 22.52 minutes Chart speed = 0.88 cm/min

*** External Standard ***

Operator:

20 Jul 95 3:56 pm

Method File Name : W88IBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Type	Time	Signal Description	Compound Name	Area	Amount
1	1VV		11.812	GC Signal 2	BIBENZYL	29128	0.053967.WT%
2	1	-----		GC Signal 2	COMP#9	*** Not Found ***	
-----	VV		12.306	GC Signal 2	Uncalibrated	3062.05	3062.0 WT%
-----	VV		12.498	GC Signal 2	Uncalibrated	128084	128084 WT%

Sample peak #2 not found at retention time 18.869 +/- 0.050 min.

*** Not all calibrated peaks found ***

⑦ Perm 7-20-95

1: Sig. 2 of DATA:BIBENZ.D

Figure A-11. Permeate Collected at Hour 7

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.89 cm/min

*** External Standard ***

Operator:

20 Jul 95 4:56 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	UV	11.811	GC Signal 2	BIBENZYL	26074	0.048310 WT%
2	1	-----	GC Signal 2	COMP#9	*** Not Found ***	

-----	UV	12.307	GC Signal 2	Uncalibrated	3044.01	3044.0 WT%
-----	UV	12.496	GC Signal 2	Uncalibrated	120435	120435 WT%

Sample peak #2 not found at retention time 18.869 +/- 0.050 min.

*** Not all calibrated peaks found ***

1: Sig. 2 of DATA:BIBENZ.D

Feed (8)
7-20

Figure A-12. Feed Corresponding to Hour 8

End of plot. Time = 0.00 to 22.51 minutes Chart speed = 0.88 cm/min

*** External Standard ***

Operator:

21 Jul 95 12:14 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	1	-----	GC Signal 2	BIBENZYL	*** Not Found ***	
2	1VV	18.887	GC Signal 2	COMP#9	87118	0.34676 WT%

----- VV 11.712 GC Signal 2 Uncalibrated 2622.86 2622.8 WT%

Sample peak #1 not found at retention time 11.840 +/- 0.050 min.

*** Not all calibrated peaks found ***

1: Sig. 2 of DATA:BIBENZ.D

Figure A-13. Permeate Collected at Hour 8

End of plot. Time = 0.00 to 22.51 minutes

Chart speed = 0.88 cm/min

*** External Standard ***

Operator:

20 Jul 95 6:04 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	UV	11.814	GC Signal 2	BIBENZYL	25837	0.047870 WT%
2	1	-----	GC Signal 2	COMP#9	*** Not Found ***	
-----	UV	12.308	GC Signal 2	Uncalibrated	3770.83	3770.8 WT%
-----	UV	12.490	GC Signal 2	Uncalibrated	107850	107850 WT%

Sample peak #2 not found at retention time 18.869 +/- 0.050 min.

*** Not all calibrated peaks found ***

(9) feed
7-20

1: Sig. 2 of DATA:BIBENZ.D

Figure A-14. Feed Corresponding to Hour 9

End of plot. Time = 0.00 to 22.51 minutes Chart speed = 0.89 cm/min

*** External Standard ***

Operator:
Method File Name : WBBIBENZ.M
Sample Info :
Misc Info:

21 Jul 95 12:48 pm

Integration File Name : DATA:BIBENZ.I
consisting of channels : 1. GC Signal 2 of BIBENZ.D
Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am
Reference Peak Window: 5.00 Absolute Minutes
Non-Reference Peak Window: 0.10 Absolute Minutes
Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	1	-----	GC Signal 2	BIBENZYL	*** Not Found ***	
2	1VV	18.886	GC Signal 2	COMP#9	83559	0.32897 WT%

----- VV 11.718 GC Signal 2 Uncalibrated 2606.13 2606.1 WT%
Sample peak #1 not found at retention time 11.840 +/- 0.050 min.
*** Not all calibrated peaks found ***

⑨ Perm Flux
7.20

1: Sig. 2 of DATA:BIBENZ.D

Figure A-15. Permeate Collected at Hour 9

End of plot. Time = 0.00 to 22.50 minutes Chart speed = 0.89 cm/min

*** External Standard ***

Operator:

20 Jul 95 6:51 pm

Method File Name : WBBIBENZ.M

Sample Info :

Misc Info:

Integration File Name : DATA:BIBENZ.I

consisting of channels : 1. GC Signal 2 of BIBENZ.D

Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:BIBENZ.Q Last Update: 19 Jul 95 10:02 am

Reference Peak Window: 5.00 Absolute Minutes

Non-Reference Peak Window: 0.10 Absolute Minutes

Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	UV	11.818	GC Signal 2	BIBENZYL	24489	0.045372 WT%
2	1	-----	GC Signal 2	COMP#9	*** Not Found ***	
-----	VV	12.315	GC Signal 2	Uncalibrated	3811.36	3811.4 WT%
-----	VV	12.500	GC Signal 2	Uncalibrated	103902	103902 WT%

Sample peak #2 not found at retention time 18.869 +/- 0.050 min.

*** Not all calibrated peaks found ***

11m
7-20

1: Sig. 2 of DATA:BIBENZ.D

A-16. Feed Corresponding to the End of the Permeation Study

End of plot. Time = 0.00 to 22.50 minutes

Chart speed = 0.89 cm/min

*** External Standard ***

Operator:
Method File Name : WBBIBENZ.M
Sample Info :
Misc Info:

21 Jul 95 8:51 am

Integration File Name : DATA:8IBENZ.I
consisting of channels : 1. GC Signal 2 of 8IBENZ.D
Bottle Number : 0 Repetition Number: 1

Calibration file: DATA:8IBENZ.Q Last Update: 19 Jul 95 10:02 am
Reference Peak Window: 5.00 Absolute Minutes
Non-Reference Peak Window: 0.10 Absolute Minutes
Sample Amount: 0.000 Uncalibrated Peak RF: 1.000 Multiplier: 1.000

Peak Num	Int Type	Ret Time	Signal Description	Compound Name	Area	Amount
1	1	-----	GC Signal 2	BIBENZYL	*** Not Found ***	
2	UV	18.884	GC Signal 2	COMP#9	76520	0.29377 WT%
-----	UV	11.706	GC Signal 2	Uncalibrated	2528.55	2528.7 WT%

Sample peak #1 not found at retention time 11.840 +/- 0.050 min.
*** Not all calibrated peaks found ***

Key Personnel Staffing Report

April - June 1995

	<u>Task 0*</u>	<u>Task 1</u>	<u>Task 2</u>	<u>Task 3</u>	<u>Task 4</u>	<u>Task 5</u>	<u>Task 6</u>	<u>Task 7</u>
Paul Liu	81.00							
Thomas Gerdes					279.00			
TOTAL	81.00	0.00	0.00	0.00	279.00	0.00	0.00	0.00

* Management time spent by Program Manager